WHAT IS CLAIMED IS:

1. In an application requiring the conduction of heat between an exothermic device and a heat sink surface, the improvement comprising interposing between said exothermic device and said heat sink surface a heat-spreading layer of a composite comprised of carbon nanotubes dispersed in a matrix of ceramic material, said composite having been uniaxially compressed in a direction transverse to said heat sink surface.

2. The improvement of claim **1** in which said composite is the product of a process comprising consolidating a mixture of ceramic particles of less than 500 nm in diameter and carbon nanotubes into a continuous mass by uniaxially compressing said mixture while passing a pulsed electric current through said mixture.

3. The improvement of claim **1** in which said composite has a density of at least 90% relative to a volume-averaged theoretical density.

4. The improvement of claim **1** in which said composite has a density of at least 95% relative to a volume-averaged theoretical density.

5. The improvement of claim **1** in which said composite has a density of at least 98% relative to a volume-averaged theoretical density.

6. The improvement of claim **1** in which said composite has a density of at least 99% relative to a volume-averaged theoretical density.

7. The improvement of claim **1** in which said carbon nanotubes are predominantly single-wall carbon nanotubes.

8. The improvement of claim **1** in which said carbon nanotubes constitute from about 1% to about 50% of said composite by volume.

9. The improvement of claim **1** in which said carbon nanotubes constitute from about 2.5% to about 25% of said composite by volume.

10. The improvement of claim **1** in which said carbon nanotubes constitute from about 5% to about 20% of said composite by volume.

11. The improvement of claim **1** in which said ceramic material is a metal oxide selected from the group consisting of alumina, zirconia, magnesium oxide, magnesia spinel, zirconia, titania, cerium oxide, chromium oxide, and hafnium oxide.

12. The improvement of claim **1** in which said ceramic material is alumina.

13. The improvement of claim **1** in which said ceramic material is alumina and said carbon nanotubes are predominantly single-wall carbon nanotubes constituting from about 5% to about 25% of said composite.

14. The improvement of claim **2** in which said process comprises uniaxially compressing said mixture at a pressure of from about 10 MPa to about 200 MPa and a temperature of from about 800°C to about 1,500°C, and said sintering electric current is a pulsed direct current of from about 250 A/cm^2 to about 10,000 A/cm^2.

15. The improvement of claim **2** in which said process comprises uniaxially compressing said mixture at a pressure of from about 40 MPa to about 100 MPa and a temperature of from about 900°C to about 1,400°C, and said sintering electric current is a pulsed direct current of from about 500 A/cm^2 to about 5,000 A/cm^2.

16. The improvement of claim **1** in which said exothermic device is a microprocessor.

17. A structural component requiring thermal insulation in high-temperature environments, said structural component comprising a substrate coated with a thermal barrier coating of a composite comprising carbon nanotubes dispersed in a matrix of ceramic material, said composite having been uniaxially compressed in a direction transverse to said surface.

18. The structural component of claim **17** in which said composite is the product of a process comprising consolidating a mixture of ceramic particles of less than 500 nm in diameter and single-wall carbon nanotubes into a continuous mass by compressing said mixture while passing a pulsed electric current through said mixture.

19. The structural component of claim **17** in which said composite has a density of at least 95% relative to a volume-averaged theoretical density.

20. The structural component of claim **17** in which said composite has a density of at least 98% relative to a volume-averaged theoretical density.

21. The structural component of claim **17** in which said composite has a density of at least 99% relative to a volume-averaged theoretical density.

22. The structural component of claim **17** in which said carbon nanotubes are predominantly single-wall carbon nanotubes.

23. The structural component of claim **17** in which said carbon nanotubes constitute from about 1% to about 50% of said composite by volume.

24. The structural component of claim **17** in which said carbon nanotubes constitute from about 2.5% to about 25% of said composite by volume.

25. The structural component of claim **17** in which in which said carbon nanotubes constitute from about 5% to about 20% of said composite by volume.

26. The structural component of claim **17** in which said ceramic material is a metal oxide selected from the group consisting of alumina, zirconia, magnesium oxide, magnesia spinel, zirconia, titania, cerium oxide, chromium oxide, and hafnium oxide.

27. The structural component of claim **17** in which said ceramic material is alumina.

28. The structural component of claim **17** in which said ceramic material is alumina and said carbon nanotubes are predominantly single-wall carbon nanotubes constituting from about 5% to about 25% of said composite.

29. The structural component of claim **18** in which said process comprises uniaxially compressing said mixture at a pressure of from about 10 MPa to about 200 MPa and a temperature of from about 800°C to about 1,500°C, and said sintering electric current is a pulsed direct current of from about 250 A/cm^2 to about 10,000 A/cm^2.

30. The structural component of claim **18** in which said process comprises uniaxially compressing said mixture at a pressure of from about 40 MPa to about 100 MPa

and a temperature of from about 900°C to about 1,400°C, and said sintering electric current is a pulsed direct current of from about 500 A/cm^2 to about 5,000 A/cm^2.

31. The structural component of claim **17** in which said structural component is a combustion gas turbine blade.